CLAIMS

What is claimed is:

1. An area-protection system comprising:

an active-array antenna to generate a high-power millimeter-wave wavefront to deter an intruder within a protected area; and

one or more reflectors positioned within the protected area to help retain energy of the wavefront within the area.

2. The system of claim 1 further comprising an intrusion-detection subsystem to detect a presence of the intruder within the protected area and generate a detection signal for the active-array antenna, wherein the active-array antenna is to generate the high-power millimeter-wave wavefront in response to the detection signal, and

wherein the high-power wavefront is to increase a skin temperature of the intruder to deter the intruder.

3. The system of claim 2 wherein the intrusion-detection subsystem is to detect the presence of a tag worn by the intruder and is to instruct the array antenna to refrain from generating the wavefront when tag is authenticated.

4. The system of claim 2 wherein the intrusion-detection subsystem includes an illuminator comprising one of an optical illuminator, a LASER illuminator, a sonic illuminator, an ultrasonic illuminator, or an RF/RADAR illuminator to transmit signals and detect intruder movement based on return signals.

5. The system of claim 1 wherein the one or more reflectors are positioned to increase an energy density of the wavefront in a predetermined location of the area.

6. The system of claim 1 wherein the array antenna comprises a plurality of semiconductor wafers arranged together on a substantially flat surface, wherein each semiconductor wafer comprises power amplifiers and a transmit antenna to generate the high-power wavefront.

7. An area-protection system comprising:

an intrusion-detection subsystem to detect presence of an intruder; and

an intrusion-inhibiting subsystem comprising one of either an active-array antenna or a passive reflect-array antenna to provide a high-power millimeter-wave wavefront in response to the detection of the intruder to deter the intruder.

8. The system of claim 7 wherein the high-power wavefront increases a skin temperature of the intruder, and

wherein the system further comprises a thermal-sensing subsystem to measure the skin temperature and to generate a control signal for the intrusion-inhibiting subsystem to maintain the skin temperature either within a predetermined temperature range or below a predetermined temperature.

9. The system of claim 8 wherein when the system includes the active-array antenna, the active-array antenna to generate a continuous-wave wavefront, and

wherein the intrusion-inhibiting subsystem further comprises a system controller to reduce a transmit power level of the wavefront in response to the control signal from the thermal-sensing subsystem to maintain the skin temperature either within the predetermined temperature range or below the predetermined temperature.

10. The system of claim 9 wherein when the system includes the active-array antenna, and

wherein the intrusion-inhibiting subsystem further comprises a system controller to reduce one of either a pulse-repetition-rate or a pulse-duration time of the wavefront in response to the control signal to maintain the skin temperature either within the predetermined temperature range or below the predetermined temperature.

11. The system of claim 7 wherein the intrusion-detection subsystem includes an intruder tracker to track movement of the intruder and to generate a tracking-control signal for the array antenna, and

wherein the intrusion-inhibiting subsystem further comprises a beam director to configure the array antenna to direct the wavefront toward the intruder in response to the tracking-control signal.

12. The system of claim 7 wherein the intrusion-detection subsystem includes a biometric lock to determine whether the intruder is one or either a biological entity or a non-biological entity, the intrusion-detection subsystem to generate a biological-identification signal when a biological entity is detected,

wherein the intrusion-inhibiting subsystem generates the high-power wavefront in response to the biological-identification signal, and

wherein the intrusion-inhibiting subsystem refrains from generating the high-power wavefront when a non-biological entity is detected.

13. The system of claim 12 wherein the intrusion-detection subsystem further comprises a biometric tracker to further track movement of a detected biological entity and to generate a biological-entity tracking-control signal for the intrusion-inhibiting subsystem, the intrusion-inhibiting subsystem to direct the wavefront toward the biological entity in response to the biological-entity tracking-control signal.

14. The system of claim 7 wherein the intrusion-detection subsystem includes an illuminator to detect the intruder based on movement.

15. The system of claim 14 wherein the illuminator is an active illuminator comprising one of an optical illuminator, a LASER illuminator, a sonic illuminator, an ultrasonic illuminator, or an RADAR illuminator which transmits signals and detects intruder movement based on return signals.

16. The system of claim 7 wherein the intrusion-detection subsystem is to detect the presence of a tag worn by the intruder,

wherein the intrusion-detection subsystem instructs the intrusion-inhibiting subsystem to refrain from generating the wavefront when tag is authenticated by the intrusion-detection subsystem.

17. The system of claim 7 wherein the intrusion-detection subsystem comprises a passive detection subsystem comprises one of an infrared (IR) sensor, an optical sensor, a sonic sensor or an ultrasonic sensor to detect the presence of the intruder.

18. The system of claim 7 wherein array antenna comprises a plurality of semiconductor wafers arranged together, wherein each semiconductor wafer comprises:

one or more sets of power amplifiers to amplify the millimeter-wave frequency; and

one or more transmit antennas to generate the high-power wavefront, wherein each set of power amplifiers is associated with one of the transmit antennas.

19. The system of claim 18 wherein array antenna is to receive a spatially-fed millimeter-wave lower-power wavefront and is to amplify the lower-power wavefront to generate the high-power wavefront.

20. The system of claim 19 wherein the array antenna further comprises a passive reflector to reflect a millimeter-wave frequency signal from a feed and provide the lower-power wavefront for incident on an active reflect-array comprising the plurality of semiconductor wafers.

21. The system of claim 19 wherein the plurality of semiconductor wafers is arranged on a substantially flat surface.

22. A method of protecting an area comprising:

detecting a presence of an intruder; and

generating a high-power millimeter-wave wavefront with one of either an active-array antenna or a passive reflect-array antenna in response to the detection of the intruder to deter the intruder.

23. The method of claim 22 further comprising:

increasing a skin temperature of the intruder with the high-power millimeter-wave wavefront;

measuring the skin temperature; and

generating a control signal to maintain the skin temperature either within a predetermined temperature range or below a predetermined temperature.

24. The method of claim 23 further comprising reducing a transmit power level of the wavefront in response to the control signal to maintain the skin temperature either within the predetermined temperature range or below the predetermined temperature.

25. The method of claim 23 further comprising reducing one of either a pulse-repetition-rate or a pulse-duration time of the wavefront in response to the control signal to maintain the skin temperature either within the predetermined temperature range or below the predetermined temperature.

26. The method of claim 22 further comprising:

tracking movement of the intruder and to generate a tracking-control signal for the array antenna; and

configuring the array antenna to direct the wavefront toward the intruder in response to the tracking-control signal.

27. The method of claim 22 further comprising:

detecting a presence of a tag worn by the intruder;

authenticating the tag; and

refraining from generating the wavefront when tag is authenticated.

28. The method of claim 22 wherein detecting comprises illuminating an area with an active illuminator comprising one of an optical illuminator, a LASER illuminator, a sonic illuminator, an ultrasonic illuminator, or an RF/RADAR illuminator which transmits signals to detect the intruder based on return signals.

29. The method of claim 22 wherein the array antenna comprises a plurality of semiconductor wafers arranged together, wherein the method further comprises:

amplifying the millimeter-wave frequency with one or more sets of power amplifiers on the semiconductor wafers; and

generating the high-power wavefront with one or more transmit antennas on the semiconductor wafers, wherein each set of power amplifiers is associated with one of the transmit antennas.